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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/058,525	01/28/2002	Gottfried Adam	GR99P3499	5406

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LERNER AND GREENBERG, PA  
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EXAMINER

MATTHEW, AARON D

ART UNIT PAPER NUMBER

2114

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/058,525

Applicant(s)

ADAM, GOTTFRIED

Examiner

Aaron D Matthew

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 28 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3-10 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 1/28/2002, 7/9/2002.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Specification***

2. The abstract of the disclosure is objected to because line 10, which reads, "in the independency tree", should read, "in the dependency tree", to be consistent with the context of the language in the abstract. Correction is required. See MPEP § 608.01(b).
3. Claims 1-10 have been examined.

### ***Claim Objections***

4. Claims 1-10 are objected to because of the following informalities:

Regarding claims 1, 9 and 10, the language, "depending on one of a magnitude and a change direction..." is confusing. It is unclear as to whether this should read,

"depending on one of a magnitude or a change of direction," or, "depending on a magnitude and a change of direction." The examiner will assume the former option in further treatment of the claims. The informality is present in claim 1, lines 22-23; claim 9, lines 22-23; and claim 10, lines 22-23.

Regarding claim 2, the language, "allocating one of a rising, a falling and a constant change direction," on lines 2-3, is confusing. It is unclear as to whether the should read, "allocating one of a rising, a falling or a constant change direction," or, "allocating a rising, a falling and a constant change direction." The examiner will assume the former option in further treatment of the claims.

Appropriate correction is required.

5. Claims 2-8 are objected to based on their dependence on claim 1.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hori et al, (U.S. 5,587,930), and further in view of Chao, (U.S. 5,519,740).

Regarding claim 9, Hori teaches a fault diagnosis system for an industrial machine, (see col. 1, lines 5-7), configured to:

- Establish an operating state of the installation defined by state variables, by determining diagnostic parameters each characterizing one of the state variables, (see col. 3, lines 3-6);
- Compile a dependency tree containing at least some of the diagnostic parameters, (note Fig. 3), by configuring the dependency tree with the following hierarchical levels,  $H_n$ , where  $n = 1, 2, \dots$ :
  - i. A first hierarchical level containing a fault diagnostic parameter characterizing a fault state variable, (see col. 3, lines 15-16 and 38-44),
  - ii. A second hierarchical level, following the first hierarchical level, and containing diagnostic parameters defining state variables acting directly on the fault state variable, (note col. 3, lines 15-35),
  - iii. A hierarchical level  $H_{n+1}$ , following a given hierarchical level  $H_n$ , and containing diagnostic parameters defining state variables acting directly on the state variables characterized by the diagnostic parameters at the given hierarchical level  $H_n$ , (note, again, Fig. 3 and col. 3, lines 15-35);

- Establish a fault path in the dependency tree starting from the fault diagnostic parameter, by identifying a responsible diagnostic parameter at the hierarchical level  $H_{n+1}$  depending on a magnitude of a diagnostic parameter at the given hierarchical level  $H_n$ , (note col. 4, lines 41-60); and
- Determine a cause of the fault from the responsible diagnostic parameter identified in the identifying step at a last one of the hierarchical levels, (see col. 4, lines 33-36).

Hori fails to teach that said establishing step also comprises identifying a responsible diagnostic parameter at the hierarchical level  $H_{n+1}$  depending on a change direction of a diagnostic parameter at the given hierarchical level  $H_n$ , though Hori does teach a system in which a fault is detected based on the measured state of a system parameter.

Chao teaches a system for identifying the cause of an abnormal behavior in an industrial machine, (i.e. "nuclear reactor", see col. 1, lines 13-19), by monitoring the trend of parameter change among associated parameters, (see col. 8, lines 3-15).

Thus, Chao teaches that a responsible parameter at a lower hierarchical level in the system is identified based on a change direction of a parameter at a higher hierarchical level in the system.

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Hori and Chao are analogous art because they are from the same field of endeavor, viz., determining the cause of abnormal behavior in industrial machines.

At the time of applicant's invention, it would have been obvious to one of ordinary skill in the art to combine the system for identifying the cause of abnormal behavior in an industrial machine, as taught in Chao, with the teaching of Hori, in order to achieve a system capable of identifying, based on a magnitude or a change direction of a parameter in a parameter hierarchy, parameters that are responsible for the abnormal behavior.

One of ordinary skill in the art at the time of applicant's invention would have been motivated to combine the teachings because Chao identifies a commonly recognized need in the field of monitoring industrial machines that is consistent with the need identified in Hori. Note col. 2, lines 1-11, in which Chao shows that a transient event in an industrial machine is difficult for an operator to respond to appropriately, and can be damaging to the system as a result. Hori teaches the importance of monitoring the state of parameters in a system in order to determine a cause of a fault, and provides an example of identifying responsible parameters in a parameter hierarchy based on a magnitude of a measured parameter. Though not explicitly stated in Hori, one of ordinary skill in the art would have clearly recognized, in view of Chao, that said monitored state of the said parameters could be a changing state, and would have been motivated to include determining, based on a



change state of a parameter in a parameter hierarchy, a parameter responsible for an abnormal behavior in the system, in order to meet the need identified in Chao of determining the cause of such behavior.

Claim 1 is rejected based upon the arguments presented in reference to claim 9, as the system of claim 9 comprises functionality that is identical to the method of claim 1.

Claim 10 is rejected based upon the arguments presented in reference to claim 9, as the system of claim 9 comprises means for performing all functionality disclosed in claim 10.

7. Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hori et al, in view of Chao, as applied to claim 1 above, and further in view of Griffiths et al, (U.S. 5,625,574).

Regarding claim 3, Hori, in view of Chao, fails to teach that the technical installation, as disclosed in reference to claim 1, is a turbine installation, however, Chao does

teach the monitoring of a technical installation that comprises a turbine, (see col. 1, lines 29-31).

Griffiths teaches a method for monitoring the operating states of a technical installation, (see col. 1, lines 8-12), and further discloses that said technical installation is a turbine installation, (see col. 1, lines 23-38).

Griffiths, Hori and Chao are analogous art because they are from the same field of endeavor, viz., monitoring the operation of an industrial installation.

At the time of applicant's invention, one of ordinary skill in the art would have considered it obvious to combine the method of monitoring a turbine installation, as taught in Griffiths, with the teachings of Hori, in view of Chao, in order to achieve a method for diagnosing a fault path, as disclosed in Hori, in view of Chao, with application to a turbine installation.

Griffiths shows that the applicability of monitoring methods for diagnosing abnormal behavior in a turbine installation, (see col. 1, lines 13-15), would have been well known in the art. One of ordinary skill in the art would, therefore, have been motivated to combine the teachings because Hori, in view of Chao, teaches a fault diagnosis and monitoring method, as discussed in reference to claim 1, with

application in industrial installations, and Griffiths shows a clearly recognized need for such a method in an industrial installation that is a turbine installation.

Regarding claims 4-6, see col. 1 lines 63-66 in Griffiths, in which the turbine installation is disclosed as being a gas, steam, or combined gas and steam turbine installation.

8. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hori et al, in view of Chao, as applied to claim 1 above, and further in view of Reid et al, (U.S. 6,298,308 B1).

Regarding claims 7 and 8, Hori, in view of Chao, fails to teach that the method discussed in reference to claim 1 utilizes a wide area network or the Internet. However, Hori, in view of Chao, does teach that said method, for establishing a cause of a fault in an industrial installation, is carried out in a computer environment.

Reid teaches a method for monitoring a technical installation in which a wide area network or the Internet, (see col. 2, lines 54-58), is utilized to facilitate the troubleshooting of existing problems in the installation from a remote location.

Reid, Hori and Chao are analogous art because they are from the same field of endeavor, viz., monitoring the operational parameters of a technical installation.

At the time of applicant's invention, one of ordinary skill in the art would have considered it obvious to combine the wide area network or Internet connections disclosed in Reid, with the method disclosed in Hori, in view of Chao, in order to facilitate remotely establishing a cause of a fault utilizing said method.

One of ordinary skill in the art would have been motivated to combine the teachings because the wide area network and Internet connections of Reid meet a need well known in the art in the field of monitoring technical installations. The method of Hori, in view of Chao, utilizes a computer environment to facilitate diagnosis of abnormal behavior in a technical installation. Reid clearly states the advantage of connecting a computer environment performing such a method to a wide area network or the Internet in improving the amount of information available to a remote operator that wishes to monitor a technical installation. Namely, Reid mentions, (see col. 2, lines 7-15), the considerable labor costs associated with requiring a technical installation to be monitored by a local operator, and teaches utilizing a wide area network or Internet connection to improve upon existing methods with said requirement. One of ordinary skill in the art would have been motivated to combine the teachings to provide said improvement by allowing a remote user to monitor a technical installation utilizing the method disclosed in Hori, in view of Chao.

***Allowable Subject Matter***

9. Claim 2 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

While Hori, in view of Chao, does teach establishing a fault path by agreement between measured change directions of the diagnostic parameters and the allocated change directions, the invention of claim 2 requires "allocating a rising, a falling or a constant change direction to each diagnostic parameter at the hierarchical level  $H_{n+1}$ , for each diagnostic parameter at the given hierarchical level  $H_n$ , as a function of a predefined change direction of the respective diagnostic parameter at the given hierarchical level  $H_n$ ". No reasonable combination of the prior art references of record that include a method for monitoring a hierarchy of diagnostic parameters to diagnose a fault, and that meets the requirements of claim 1, could be made with Hori, in view of Chao, to arrive at the above-mentioned limitation of claim 2, absent impermissible hindsight reconstruction. As such, claim 2 is believed to patentably distinguish over the prior art of record.

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Tong et al, (U.S. 5,272,704), teaches a method for isolating a faulty component of a system comprising generating a diagnostic tree.
- Hekmatpour, (U.S. 5,870,768), teaches an expert system and method for diagnosing a system utilizing a hierarchical knowledge base.
- Oda et al, (U.S. 5,127,005), teaches a fault diagnosis expert system for locating sources of machine trouble comprising a hierarchical search tree structure.
- Monta et al, (U.S. 5,914,875), teaches a method for diagnosis abnormal behavior in a turbine installation comprising a hierarchical plant model.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron D Matthew whose telephone number is (703) 605-1211, or (571) 272-3662 after October 15, 2004. The examiner can normally be reached on Mon-Fri, from 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert W Beausoliel can be reached on (703) 305-9713, or (571) 272-3695


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after October 15, 2004. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Aaron D Matthew  
Examiner  
Art Unit 2114

ADM

  
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